Abstract

Technologies Developed by and Lessons Learned from the Deep Space 2 Mars Microprobe Project

S.A. Gavit
Jet Propulsion Laboratory, California Institute of Technology,
MS 180-602C, 4800 Oak Grove Drive, Pasadena, CA 91109
sarah.a.gavit@jpl.nasa.gov

In December 1999, two grapefruit-size probes will crash into Mars at speeds of over 400 mph and penetrate the surface in search of water ice. If successful, these probes of NASA's Deep Space 2 mission will demonstrate technologies that will enable future network science missions. In these missions, scientists envision fleets of small landers deployed across a planet to collect science data from different locations at the same time. To accomplish this ambitious mission, the Deep Space 2 team embarked on a rigorous technology development program, which included the design and testing of highly integrated mechanical/electrical systems, packaging techniques for high G survival, miniaturized instruments, cold temperature electronics, penetration mechanics, and a passive, single-stage entry system design. All of these technology developments were performed in the context of a "faster, better, cheaper" environment with a 3 year development cycle from project start until launch. Because Deep Space 2 was one of the first technology demonstration missions funded by NASA's New Millennium Program, lessons were learned from both a programmatic and a technical viewpoint. This paper will provide an overview of the technologies developed, and a summary of the lessons learned during the design, integration, and test phases.